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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/589,437	08/01/2007	Kenichi Shiraishi	1220.1001	9870
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EXAMINER				
ASFAW, MESFIN T				
ART UNIT		PAPER NUMBER		
2882				
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/589,437

**Applicant(s)**

SHIRAIISHI, KENICHI

**Examiner**

Mesfin T. Asfaw

**Art Unit**

2882

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 21 July 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 6-8, 19, 21 and 23 is/are allowed.
- 6) ☒ Claim(s) 1-5, 9-18, 20, 22 and 24-29 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB-06)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

### DETAILED ACTION

Acknowledgement is made to the amendment filed 07/21/2009. Claims 9 and 13 are amended. The objection made in the first Office Action is withdrawn.

Applicant's argument with regard to the rejection of claims 1, 2, 3, and 4-15 is persuasive. Accordingly, claim rejection made in the first Office Action (mailed date: 01/22/2009) has been withdrawn. Claims 1-29 are pending in this application.

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

2. Claims 1-5, 16, 18, 22, and 24-28 are rejected under 35 U.S.C. 102(a) as being anticipated by Hirukawa [PCT/JP03/15675].

Note: In this Office Action, Hirukawa [US 2006/0164615 A1] is used as an English translation of PCT/JP03/15675 document.

**As per Claims 1**, Hirukawa teaches an exposure apparatus 100 (See fig. 1) that exposes a substrate by irradiating the substrate with exposure light through a projection optical system and a liquid (See fig. 3), comprising:

a liquid supply mechanism 32 that supplies the liquid between an image plane side tip part of the projection optical system and an object that opposes the tip part (Para 151);

a timer (not shown) that measures the time that has elapsed since the supply of the liquid by the liquid supply mechanism was started (the immersion system of Hirukawa must have a timer to determine the period of time elapsed as expressed in Para 194); and

a control apparatus 20 that determines, based on a measurement result of the timer, whether a space (the space that is occupied by 32), which is between the image plane side tip part of the projection optical system 40 and the object W and includes at least an optical path of the exposure light, is filled with the liquid (Para 193-194).

**As per Claim 2**, Hirukawa teaches an exposure apparatus according to claim 1, wherein the control apparatus determines, based on the measurement result of the timer, that the space is filled with the liquid when the time that has elapsed since the supply of the liquid was started reaches a prescribed time (Para 194).

**As per Claim 3**, Hirukawa teaches an exposure apparatus according to claim 1, wherein

the liquid supply mechanism 32 comprises a support port, which supplies the liquid, and a valve 62a, which opens and closes a passage that is connected to the supply port; and

the timer starts the measurement of time when the valve has opened the passage (Para 194).

**As per Claim 4**, Hirukawa teaches an exposure apparatus according to claim 1, comprising:

a detector that detects a gas portion in the liquid;

wherein,

after the control apparatus determines that the space is filled with the liquid, it detects a gas portion in the liquid that filled the space (Para 35 and Para 50).

**As per Claim 5**, Hirukawa teaches an exposure apparatus according to claim 1, wherein

after the control apparatus determines that the space is filled with the liquid, it irradiates the exposure light (Para 198).

**As per Claim 25**, Hirukawa teaches an exposure apparatus according to claim 1, comprising:

a liquid recovery mechanism that recovers the liquid while the liquid is being supplied by the liquid supply mechanism (Para 38); wherein

the control apparatus 20 determines whether the space is filled with the liquid based upon the measurement result of the timer and information from the liquid recovery mechanism (Para 193-194).

**As per Claim 26**, Hirukawa teaches an exposure apparatus according to claim 25, wherein the measurement result of the timer is an elapsed time since the supply of the liquid was started (Para 194).

**As per Claim 27**, Hirukawa teaches an exposure apparatus according to claim 26, wherein the information from the liquid recovery mechanism is an amount of liquid recovered by the liquid recovery mechanism per unit of time (Para 193-194).

**As per Claim 28**, Hirukawa teaches an exposure apparatus according to claim 1, comprising:

a liquid recovery mechanism 52 that recovers the liquid while the liquid is being supplied by the liquid supply mechanism (Para 38); wherein

the control apparatus 20 raises an alert when an amount of liquid recovered by the liquid recovery mechanism does not reach a predetermined value after a lapse of a prescribed time measured by the timer, the prescribed time being the elapsed time since the supply of the liquid was started (Para 165-166).

**As per Claims 16, 18, 22**, Hirukawa teaches the method as claimed, because under the principles of inherency, if a prior art device, in its normal and usual operation, would necessarily perform the method claims, then the method claimed will be considered to be anticipated by the prior art device. When the prior art device is the same as a device described in the specification for carrying out the claimed method, it can be assumed the device will inherently perform the claimed process. *In re King*, 801 F.2d 1324,231 MPEP 2112.02".

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 9-15, 17, 20 and 29 rejected under 35 U.S.C. 102(e) as being anticipated by Arai [US 20050094125 A1].

**As per Claims 9-13 and 29**, Arai teaches an exposure apparatus EX (See fig. 7) that exposes a substrate P by irradiating the substrate with exposure light through a projection optical system PL and a liquid 2a, comprising:

a liquid supply mechanism 10 that supplies the liquid between an image plane side tip part of the projection optical system PL and an object P that opposes the tip part;

a liquid recovery mechanism 20 that recovers the liquid;

Arai also teaches a predetermined amount (threshold value) of liquid is held between the projection optical system and the substrate on the substrate stage at least during exposure and the liquid is recovered while moving a recovery port of the liquid recovery mechanism and the object relative to one another. And,

a control apparatus CONT that determines, based on the measurement results of the first measuring instrument and the second measuring instrument, whether a space, which is between the image plane side tip part of the projection optical system and an object opposing the tip part and includes at least an optical path of the exposure light, is filled with the liquid (Para 92-93).

**As per Claim 14**, Arai teaches an exposure apparatus according to claim 13, wherein

the liquid is recovered while moving a recovery port of the liquid recovery mechanism and the object relative to one another (Para 86).

**As per Claim 15**, Arai teaches an exposure apparatus according to claim 13, wherein

the object includes the substrate P or a movable substrate stage (PH, PST) that holds the substrate; and

the liquid is filled between the projection optical system and the substrate or a prescribed region AR2 on the substrate stage (Para 88).

**As per Claims 17 and 20**, Arai teaches the method as claimed, because under the principles of inherency, if a prior art device, in its normal and usual operation, would necessarily perform the method claims, then the method claimed will be considered to be anticipated by the prior art device. When the prior art device is the same as a device described in the specification for carrying out the claimed method, it can be assumed the device will inherently perform the claimed process. *In re King*, 801 F.2d 1324,231 MPEP 2112.02".

***Allowable Subject Matter***

5. Claims 6-8, 19, 21, and 23 are allowed.
6. The following is a statement of reasons for the indication of allowable subject matter: the prior art alone or in combination, neither discloses nor makes obvious a timer that measures the time that has elapsed since the supply of the liquid by the liquid supply mechanism was stopped;  
a liquid recovery mechanism that recovers the liquid while the liquid is being supplied by the liquid supply mechanism, as well as after such supply has stopped; and



a control apparatus that determines, based on a measurement result of the timer, whether the liquid has been recovered from the space between the image plane side tip part of the projection optical system and the object.

### ***Response to Arguments***

7. Applicant's arguments with respect to claims 1, 2, 3, and 4-15 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mesfin T. Asfaw whose telephone number is 571-270-5247. The examiner can normally be reached on Monday to Friday, 7:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward J. Glick can be reached on 571-272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mesfin T Asfaw/  
Examiner, Art Unit 2882

/Hung Henry Nguyen/  
Primary Examiner of Art Unit 2882